

## EFFECT MODIFICATIONS OF SMOKING ON RISK OF MORTALITY ASSOCIATED WITH INFLUENZA

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**Background and Aims:** Influenza is well known to cause heavy disease burden in both temperate and tropical/subtropical regions. Although smoking has been found to increase susceptibility to influenza infection, its role in modifying the mortality risk associated with influenza remains unexplored. This study examined the effect modifications of cigarette smoking on influenza-associated mortality in a cohort of older population in Hong Kong.

**Methods:** During 1998 to 2001, a total of 66,820 (22,679 males and 44,141 females) ambulatory persons aged 65 years or older enrolled in 18 Elderly Health Centres of the Department of Health in Hong Kong. They were interviewed, examined and followed up until December 2009 for mortality outcomes. They were stratified into three groups: never-, ex- and current-smokers. Cox regression models with time-dependent covariates were used to assess the excess risks (ER) of mortality associated with levels of influenza virus activity defined by the proportion of positive isolation in weekly specimens sent for making diagnosis to the Virology Laboratory of Queen Mary Hospital in Hong Kong. The modifying effect of smoking was assessed by Cox proportional hazard models with time-dependent interaction terms defined as the product of influenza and smoking variables with adjustment for potential confounding variables.

**Results:** ER of mortality for all natural causes associated with a 10% increase in influenza virus activity were 1.3% (95%CI: -1.6, 4.3), 4.8% (0.5, 9.3) and 5.3% (-0.6, 11.6) in never-, ex- and current-smokers, respectively. In models with interaction terms, changes in ER of mortality in ever (ex- and current) smokers relative to never smokers were 1.0% (-5.5, 7.9) and 6.0% (-0.9, 13.4) for males and females, respectively.

**Conclusions:** This study shows that smoking modifies the influenza burden on mortality and provides evidence to support anti-smoking strategies in conjunction with other preventive measures such as vaccination and non-pharmaceutical interventions against influenza.